card **10** or circuit board, the design of the liquid cooling system (not shown) may be standardized and simplified. By facilitating a common cold plate assembly **100** to be used with different thermal interposer assemblies **200**, modifying the cooling system is made easier. For example, in order to use a cold plate assembly **100** that was used to cool a first computer adapter card to cool a second computer adapter card (having a different configuration), only the thermal interposer assembly **200** (or one or more of the planar bodies of the assembly) needs be modified. This in turn, reduces development and production cycles, as well as production costs. Replacement or addition of adapter cards **10**, to a system does not require breech or modification of the liquid coolant circulation pathways. Modular cold plate assembly **100** provides a standardized component which may be disconnected from a thermal interposer assembly **200** and re-installed in a different thermal interposer assembly without removal from the liquid coolant system or breach of the liquid coolant pathways, thereby reducing the risk of coolant loss, leaks, or the introduction of air into the system.

An exemplary embodiment of a liquid cooling system of a computer system will now be described to illustrate a method of using the thermal interposer assembly of the current disclosure. FIG. **5** shows a liquid cooling system **400** of a computer system. The cooling system may include cooling modules **410** and **420** that are adapted to cool heat-generating electronic components (such as, for example, CPUs) mounted on the mother board **320** of the computer. These cooling modules **410** and **420** may, without limitation, be any liquid cooling solution that is configured to cool the respective electronic components. Cooling system **400** may also include two thermal interposer assemblies **200***a* and **200***b* that are coupled to adapter cards **10***c* and **10***d*, respectively, which are plugged into the mother board. These thermal interposer assemblies **200***a* and **200***b* may have the same configuration (and the same elements) as thermal interposer assembly **200** illustrated in FIGS. **2**A-**2**C and FIG. **3**, described previously. For clarity, the elements of thermal interposer assemblies **200***a* and **200***b* are not identified in FIG. **5**. In the discussion that follows, reference will be made to the elements of the thermal interposer assembly **200** depicted in FIGS. **2**A-**2**C and FIG. **3**. It should be noted that any thermal interposer assembly of the current disclosure can be used with liquid cooling system **400**.

Thermal interposer assemblies **200***a* and **200***b* may be coupled to adapter cards **10***c* and **10***d* by any means known in the art. Thermal interposer assembly **200***a* may be coupled to adapter card **10***c* such that side **206** of lower planar segment **204** of the thermal interposer assembly **200***a* (see FIGS. **2**A-**2**C) is in thermal contact with one or more heat sources of the adapter card **10***c*. A thermal conducting medium such as thermal grease may be placed between the mating surface of side **206** and the heat source for good thermal contact between these surfaces. The thermal interposer assemblies **200***a* and **200***b* also includes cold plate assemblies **100***a* and **100***b* positioned in the heat transfer regions **212** of the respective thermal interposer assemblies. These cold plate assemblies **100***a* and **100***b* circulate cooling liquid therethrough, as described previously. In the illustration of FIG. **5**, the cooling liquid is shown to pass through the two cooling modules **410** and **420** and the two thermal interposer assemblies **200***a* and **200***b* in a serial manner. That is, cooling liquid exiting cooling module **410** enters cooling module **420**, and the cooling liquid exiting cooling module **420** passes through thermal interposer assembly **200***a*, and then through thermal interposer assembly **200***b*, before being directed to the heat exchanger **350**. At the heat exchanger **350**, the hot cooling liquid may be cooled by air flowing therethrough. Under this arrangement, inlet tube **320** that directs the cooling liquid into thermal interposer assembly **200***a* (from cooling module **420**), may be coupled with inlet port $\mathbf{104}_{IN}$ of cold plate assembly **100***a*, and outlet port $\mathbf{104}_{OUT}$ of cold plate assembly **100***a* may be coupled with outlet tube **310** to circulate the cooling liquid through cold plate assembly **100***a* (as described previously with respect to FIG. **3**). However, as people of ordinary skill in the art know, this arrangement of the liquid cooling system **400** is not a limitation and the liquid cooling system may be arranged in any manner without limitation. In a typical application, the cooling system **400** may be arranged such that hotter components are cooled first with the cooler liquid coming from the heat exchanger **350**.

If it is desired to upgrade the computer by replacing adapter card **10***a* with another adapter card that includes additional heat-generating electronic components that need cooling (or by adding a new adapter card), the cooling system of the computer may be quickly and efficiently modified to cool the upgraded adapter card. This may be accomplished by replacing the thermal interposer assembly **200** (or the planar bodies **202**, **204** of the thermal interposer assembly **200**) with another thermal interposer assembly that is configured to cool the heat-generating components of the upgraded adapter card. The card assembly including the thermal interposer assembly **200** and cold plate component **100** may be configured to fit within a selected spatial volume corresponding to a single-slot adapter card or a double-slot adapter card of the computer. With a thermal interposer assembly **200** in thermal contact with one or more heat sources, efficient cooling of multiple circuits on the adapter card **10** or circuit board is achieved with a common cooling system, eliminating the need for separate or individual cooling systems associated with each adapter card or circuit board. Heat drawn from the heat sources is retained within the planar bodies **202**, **204** of the thermal interposer assembly **200** for transfer to the liquid coolant circulating through the modular cold plate assembly **100**, reducing heat transfer to the ambient air surrounding the adapter card and contained within the computer chassis. Similarly, by transferring heat to the liquid coolant, the need for air circulating fans in proximity to the adapter card or circuit board is reduced.

As various changes could be made in the above construction without departing from the scope of the disclosure, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense. Similarly, the specific planar configuration of the planar body shown in the drawings will be understood to be exemplary, and may be modified as required to suit any of a variety of personal computer adapter card configurations without departing from the scope of the invention.

What is claimed is:

1. A cold plate assembly for a heat-generating electronic component, comprising:

a thermally conducting body configured to be thermally coupled to the heat-generating electronic component such that a first surface of the thermally conducting body is in thermal contact with a surface of the electronic component, and wherein the thermally conducting body comprises at least one of microchannels to pass a cooling liquid therethrough and features configured to improve heat transfer from the thermally conducting body to the cooling liquid; and

a fluid circulation body, comprising an inlet adapted to receive the cooling liquid into the fluid circulation body,